

Remarks

Claims 15-19, 22 and 46 are pending. Claims 47-50 are new. Claims 15 and 18 are amended for clarity.

The Applicants thank the Examiner for conducting an interview with the Applicants' representative on March 10, 2009. As suggested by the Examiner, Claim 15 has been amended for clarity. (New Claims 47 and 48 have been similarly amended.) During the interview, the Applicants' representative presented the substance of amended Claim 15 and new Claims 47 and 48. These are now included in the application.

Claims 15-17, 19, 22 and 46 stand rejected as being unpatentable over Wadahara in view of Lewis.

Claim 15 has been amended to include that a maximum cross-sectional waviness of a layer of a reinforcing fiber substrate in a section of said composite material is 0.3 mm or less. (Support for this element is found page 14, second full paragraph of the originally-filed specification.)

Neither Wadahara nor Lewis disclose or suggest this element. Further, it would not have been obvious to modify Wadahara's structure to include a gap such that a maximum cross-sectional waviness of a layer of a reinforcing fiber substrate in a section of said composite material is 0.3 mm or less. In particular, one skilled in the art would have no reason to believe such a modification would produce desirable results. The prior art teaches that a gap between adjacent reinforcing carbon fiber yarns causes waviness, which causes structural problems in the composite material. For example, JP-A-8-158665 provides gaps between reinforcing fiber yarns forming a reinforcing fiber substrate. The gap makes it easier to impregnate the composite. However, when substrates are laminated at a cross-directional condition, the concave/convex

forms resulting from the difference between the fiber densities of reinforcing fiber yarn portions and the gap portions are transferred to each other between adjacent layers of the cross-directional lamination portions. The reinforcing fiber yarns become waved. Such waviness decreases the strength of the composite. Thus, the prior art teaches that such modifications to Wadahara's structure would inhibit an intended functionality of Wadahara's structure; namely, to increase strength. For these reasons, it is respectfully submitted that Claim 15 is allowable. Claims 16, 17, 19, 22 and 46 depend from Claim 15 and, therefore, are allowable.

Claim 18 stands rejected as being unpatentable over Wadahara in view of Lewis, further in view of Bockrath. Claim 18 depends from Claim 15 and, therefore, is allowable.

New independent Claim 47 includes all the elements of amended Claim 15 except that a maximum cross-sectional waviness of a layer of a reinforcing fiber substrate in a section of said composite material is 0.3 mm or less. However, it includes that the reinforcing fiber group is arranged with reinforcing fiber yarns in parallel to each other in one direction and spacer yarns, each having a concave/convex surface, arranged between said reinforcing fiber yarns, and wherein the resin material is adhered at 2 to 20% by weight at least to one surface of said reinforcing fiber group. (Support for these element is found page 9, second full paragraph of the originally-filed specification.)

Neither Wadahara nor Lewis disclose or suggest these elements. Further, it would not have been obvious to modify Wadahara's structure to include these elements. The spacer yarns create a path for a liquid resin in the thickness direction. Because spacer yarns exist between the reinforcing fiber yarns (see e.g., FIG. 8), there is almost no difference in thickness between the portion of the reinforcing fiber yarn and the portion between the reinforcing fiber yarns. The substrate can have a uniform thickness, and even in a lamination, the respective layers do not

deflect (wave), creating a composite material exhibiting improved mechanical properties. Wadahara does not disclose or suggest spacer yarns. Rather, it discloses that a first resin adhering relatively more densely on a surface of the fabric, can function as a spacer. (See column 6, lines 56-67 and column 7, lines 1-10.) However, Wadahara discloses that the spacer resin forms a flow path for a third resin into the substrate. Thus, based on Wadahara, one skilled in the art would not be motivated to provide yarn having a concave/convex surface as a spacer arranged between said reinforcing fiber yarns, and wherein the resin material is adhered at 2 to 20% by weight at least to one surface of said reinforcing fiber group, as recited in new Claim 47.

New independent Claim 48 includes all elements of amended Claim 15 except that a maximum cross-sectional waviness of a layer of a reinforcing fiber substrate in a section of said composite material is 0.3 mm or less. However, it includes the elements of Claim 16 and further adds that the yarns forming the warp-direction auxiliary yarn group have been treated with a sizing or collecting treatment. (Support for this element is found page 55, first full paragraph of the originally-filed specification.)

A sizing or collecting treatment is performed to efficiently form a flow path of a matrix to prevent breakage of such a flow path caused by too much widening of the warp-direction auxiliary yarns. Neither Wadahara nor Lewis discloses or suggests a sizing or collecting treatment or means for preventing too much widening of the warp-direction auxiliary yarns. Further, it would not have been obvious to one skilled in the art to modify Wadahara's structure to include the sizing or collecting treatment for the same reasons provided above with respect to amended Claim 15.

New Claim 49 recites that the sizing or collecting treatment comprises a yarn covering and a binder. (Support for this element is found page 55, first full paragraph of the originally-

filed specification.) Claim 49 is allowable because it depends from Claim 48, which is allowable for the reasons provided above.

New Claim 50 recites that at least one covering yarn is wrapped around the warp-direction auxiliary yarn group yarns. (Support for this element is found page 77, second full paragraph of the originally-filed specification.) Claim 50 is allowable because it depends from Claim 49, which is allowable for the reasons provided above.

In light of the foregoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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